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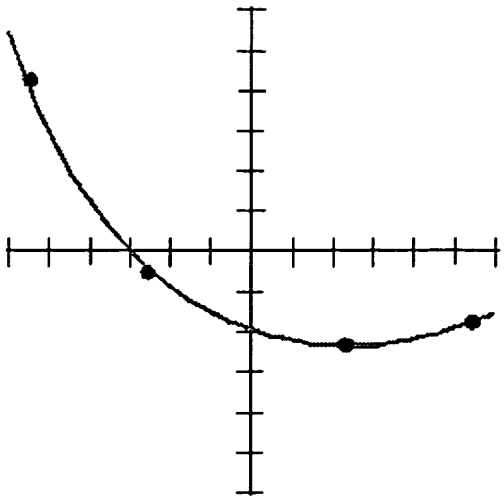
spline

In computer graphics, a spline is a curve that connects two or more specific points, or that is defined by two or more points. The term can also refer to the mathematical equation that defines such a curve.

Consider the set of points in the illustration below. It is easy to envision a curve (red) that approximately connects the four points (blue). In the old days of mechanical drafting, a flexible metal or wooden strip (called a *spline*, and the term from which the present term derives) was used to construct approximate graphs such as this.



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A computer can be used to test various curves, having known formulas, for an optimal "fit" for any finite set of poin example shown here, a near-perfect fit exists, and the curve has a relatively simple formula. Not all splines are thi straightforward. But in theory, at least one spline curve can be found that approximates a continuous graph for an points.

Read more about it at:

> The Simpson College Math Department provides Electronic Resources for Splines.

> Tim Lambert at the University of New South Wales, Australia, discusses Spline Curves.

This word suggested by: Sally Carpenter
Last updated on: Dec 07, 2000

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Mathematics Department

Math 385 - Senior Seminar - Electronic resources for Splines

The words "curve" and "spline" are, for all practical purposes, used interchangeably in computer graphics.

"A picture is worth a thousand words." These links run Java which is an interactive programming language, so be sure to interact. Drag points and watch the curves.

- Play with curves that were produced by Lagrange interpolation .
- See how well cubic splines approximate a specific curve.
- See the geometry of a cubic spline curve.
- See how the control points control a Bezier curve.

Chebyshev Curves

- A recursion formula for Chebyshev polynomials
- Recommendation of a book by T. J. Rivlin
- A connection between Chebyshev polynomials and Pascal's triangle

Convex Hulls

- A program to caculate convex hulls

Maple files

- Polynomial interpolation
- Bezier curves

Aitken's method of interpolation

- A biography of Aitken

Quadrature Rules

- A slide presentation of quadrature rules
- Examples of numerical integration

References

- A bibliography of spline references.

Notes and lectures

- Properties of Bezier curves, some examples, and the c source code to produce them.
- Properties of spline curves, some examples, and the c source code to produce them.
- Some information about a draftman's spline.
- Geometric modeling notes on many curve topics.
- Outline of a lecture on curves.
- Find a simple way to represent the Bezier basis.
- Lagrange polynomial interpolation and its limitations. Even though this is an evaluated Mathematica document and you don't have Mathematica available to you, there is much information in this link. You can reproduce all these results with Maple.
- Hermite curves. Again, this is an evaluated Mathematica document.

Projects

- A project for knot selection.

Writing

- On this page Annalisa Crannell gives advice for writing in mathematics .

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This page is maintained by Murphy Waggoner < waggoner@storm.simpson.edu > and was last updated 8/20/98.